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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/579,908  | 07/14/2006  | Fumio Kagami         | 040302-0562         | 5973             |
| 22428 7590 10/28/2010<br>FOLEY AND LARDNER LLP<br>SUITE 500<br>3000 K STREET NW<br>WASHINGTON, DC 20007 |             |                      |                     |                  |
| EXAMINER  |             |                      |                     |                  |
| CONLEY, O K   |             |                      |                     |                  |
| ART UNIT  |             | PAPER NUMBER         |                     |                  |
| 1726  |             |                      |                     |                  |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/579,908

**Applicant(s)**

KAGAMI ET AL.

**Examiner**

HELEN O.K. CONLEY

**Art Unit**

1726

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 August 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 5 and 8-23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 7, 24-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 August 2010 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB06)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. The Applicants' amendments have been received on 8/27/10. Claims 1-4, 6, 7, 24, 25 are amended. Claim 26 is new.

#### ***Information Disclosure Statement***

2. The information disclosure statement (IDS) submitted 7/30/10 was filed. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

#### ***Drawings***

3. The drawings were received on 8/27/10. These drawings are acceptable
- 4.

#### ***Claims Analysis***

5. Regarding claim 2, the claim limitation "voltage rising detection means for," is being treated under 35 U.S.C 112, sixth paragraph. The "means for" claim limitation is equivalent to the voltage rising detector as disclosed in Applicants' specification
6. Regarding claim 2, the claim limitation "control means" is being treated under 35 U.S.C 112, sixth paragraph. The "means for" claim limitation is equivalent to the control unit as disclosed in the Applicants' specification.

#### ***Claim Rejections - 35 USC § 102***

7. The rejections under 35 U.S.C 102(b) as being anticipated by Ueno et al., on claims 1-4, 24 are withdrawn because the Applicants amended the claims.
8. The rejections under 35 U.S.C 102(b) as being anticipated by Fuglevand et al., on claims 1-4, 6, 24, 25 are withdrawn because the Applicants amended the claims.

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1-4, 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Nonobe (US Publication 2002/0192520).

Regarding claim 1, the Nonobe reference discloses a fuel cell system comprising a fuel cell stack formed by stacking a plurality of fuel cells (P31) for generating power through an electrochemical reaction utilizing reactant gas (P28) and an operation mode of the fuel cell stack is determined based on a voltage rising condition of the fuel cell stack (P64) that is detected after supply of the reactant gas is started (P51) and the voltage rising condition is determined based on a differential coefficient of a voltage value of the fuel cell stack with respect to time ( $dV/dt$ ; P64)

Regarding claim 2, the Nonobe et al. reference discloses fuel cell stack formed by stacking a plurality of fuel cells (P31) for generating power through an electrochemical reaction utilizing reactant gas (P28) and a voltage rising detection means for detecting a voltage rising condition (40) of the fuel cell stack after supply of reactant gas is started (P51), wherein the voltage rising detector is configured to determine the voltage rising condition based on a differential coefficient of a voltage value of the fuel cell stack with respect to time ( $dv/dt$ ; P64). The fuel cell system further

comprises a control means for (CPU 62) determining an operation mode (P65) of the fuel cell stack is determined based on a voltage rising condition of the fuel cell stack that is detected after supply of the reactant gas is started (P64 and P51)

Regarding claim 3, the Nonobe reference discloses fuel cell stack formed by stacking a plurality of fuel cells (P31) configured to generate power through an electrochemical reaction utilizing reactant gas (P28) and a voltage rising detector (40) configured to detect a voltage rising condition of the fuel cell stack after supply of the reactant gas is started, wherein the voltage rising detector is configured to determine the voltage rising condition based on a differential coefficient of a voltage value of the fuel cell stack with respect to time ( $dV/dt$ , P64). The fuel cell system also comprises a control (CPU 62) configured to determine an operation mode (P65) of the fuel cell stack is determined based on a voltage rising condition of the fuel cell stack that is detected after supply of the reactant gas is started (P64 and P51).

Regarding claim 4, the Nonobe reference discloses the voltage rising detector determined the voltage rising condition by determining whether a differential coefficient of the voltage value of the fuel cell stack with respect is positive or negative (Fig. 5 or in this case if the value is more or less than the proper humidification).

Regarding claim 24, the Nonobe et al. reference discloses the voltage rising detector (voltmeter) detects the voltage rising condition by measuring voltage of all of the fuel cell units (P74).

11. The rejections under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103 (a) as obvious over Fuglevand et al., on claims 6 and 7 are withdrawn because the Applicants amended the claims.

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

13. Claims 6 and 7 are rejected under 35 U.S.C. 102 (b) as anticipated by or, in the alternative, under 35 U.S.C. 103 (a) as obvious over Nonobe (US Publication 2002/0192520).

Regarding claim 6, the Nonobe reference discloses the claimed invention above and further incorporated herein. The Nonobe reference discloses the control unit determines whether the fuel cell electrolyte is humidified within proper range by measuring current load of the fuel cell stack in accordance to the voltage rising condition detected by the voltage rising detector. When humidification is out of proper range the humidified reactants vary in flow so to rise or decrease humidification within

the stack. Since the increase or decrease of the reactants is proportional to current load output of the fuel cell, the control unit inherently also varies the current load until the current is at I set which is equivalent to being in the proper humidification range (P62-P65).

Regarding claim 7, the Nonobe reference discloses the claimed invention above and further incorporated herein. The Nonobe reference also discloses wherein the control unit determines if the voltage deviation ( $dv1-dv2/dt$ ) is 0 or greater but if voltage deviation is less than 0 or negative the increase of humidified reactants increase thus increasing the current load and humidification to the electrolyte. Therefore the opposite is also inherently true, wherein when the voltage deviation ( $dv1-dv2/dt$ ) is 0 or greater (positive differential coefficient) which means the electrolyte is properly humidified which would decrease humidified reactants required thus reducing the current load (P69-72).

### ***Claim Rejections - 35 USC § 103***

14. The rejections under 35 U.S.C 103 (a) as obvious over Ueno et al., on claim 25 is withdrawn because the Applicants amended the claims.
15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nonobe (US Publication 2002/0192520) in view of Roberts et al. (US Publication 2001/0028967).

Regarding claim 25, the Nonobe reference discloses the claimed invention above and further incorporated herein. The Nonobe reference also discloses upon starting the fuel cell stack the control unit is configured to determine the operation mode of the fuel cell stack in accordance to the voltage rising condition detected by the voltage rising detector and is configured to operate the fuel cell stack (P37, P63-66). The Nonobe reference is silent in disclosing freezing conditions for fuel cell start-up, however, the Roberts et al. reference discloses that fuel cell systems with humidification capabilities may be subjected to freezing conditions during start-up. The Roberts et al. reference also discloses methods of overcoming cold start-up conditions . Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate cold start-up procedures as disclosed by the Roberts et al. reference for the fuel cell system as disclosed in the Nonobe reference in order to provide a diverse fuel cell for user convenience in colder climates.

Regarding claim 26, the Nonobe reference discloses the claimed invention above and further incorporated herein. The Nonobe reference discloses the control unit configured to determine the operation mode of the fuel cell stack in accordance with the voltage rising conditions detected by the voltage rising detector (40). The control unit further configured to operate the fuel cell stack in the determined operation mode (Fig. 4, P64). The Nonobe reference also discloses that humidification is essential to the fuel



cell but is silent in disclosing the control unit is configured to determine the operation mode of the fuel cell stack upon the determination of whether an outside temperature is below a freezing temperature of water. However, the Roberts et al. reference discloses that fuel cell comprising humidification capabilities comprises cold start problems in which water present in the fuel cell would freeze resulting physical damage or undesirable blockages (P37-P38). The Roberts et al. reference also discloses measuring fuel cell temperatures at cold start in order to determine an operational mode for the fuel cell stack (P43, Fig. 2-4). Therefore it would have been obvious to one of ordinary skill in the art at that time the invention was made to incorporate cold start operations by measuring the fuel cell temperature at start up and determining an operation mode for the fuel cell stack with humidification capabilities as disclosed by the Robert et al. reference fro the fuel cell system the requires humidification as disclosed by the Nonobe reference in order or provide a diverse fuel cell for user convenience in colder climates. Furthermore, the Nonobe reference discloses the fuel cell is apart or outside of the control unit, thus the modification of the fuel cell system will require the temperature measured in the fuel cell (i.e. temperature outside of the control unit).

### ***Response to Arguments***

17. Applicant's arguments with respect to claim1-4, 6-7, 24 and 25 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

18. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **HELEN O.K. CONLEY** whose telephone number is (571)272-5162. The examiner can normally be reached on Monday-Friday 8am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Helen O.K. Conley/  
Examiner, Art Unit 1795